BS ISO 17940:2015

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Ships and marine technology — Hinged watertight doors

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A list of organizations represented on this committee can be obtained on request to its secretary.

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Foreword

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The committee responsible for this document is ISO/TC 8, *Ships and marine technology*, Subcommittee SC 8, *Ship design*.

Ships and marine technology — Hinged watertight doors

1 Scope

This International Standard specifies the classification, marking and requirements for packaging, storage and transportation of hinged watertight doors (hereinafter referred to as watertight doors).

This International Standard is applicable to the design, fabrication and acceptance of the watertight doors capable of bearing the pressure from both inside and outside due to a headwater up to 10 m.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 8501-1, *Preparation of steel substrates before application of paints and related products — Visual assessment of surface cleanliness — Part 1: Rust grades and preparation grades of uncoated steel substrates and of steel substrates after overall removal of previous coatings*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

3 Classifications and marking

3.1 Opening direction

Depending on the opening direction, watertight doors shall be classified into the following two types (see Figure 1):

— Type L-Left-hand watertight door (hinge stays left side viewed from where people are standing);

— Type R-Right-hand watertight door (hinge stays right side viewed from where people are standing).

Key

1 hinge

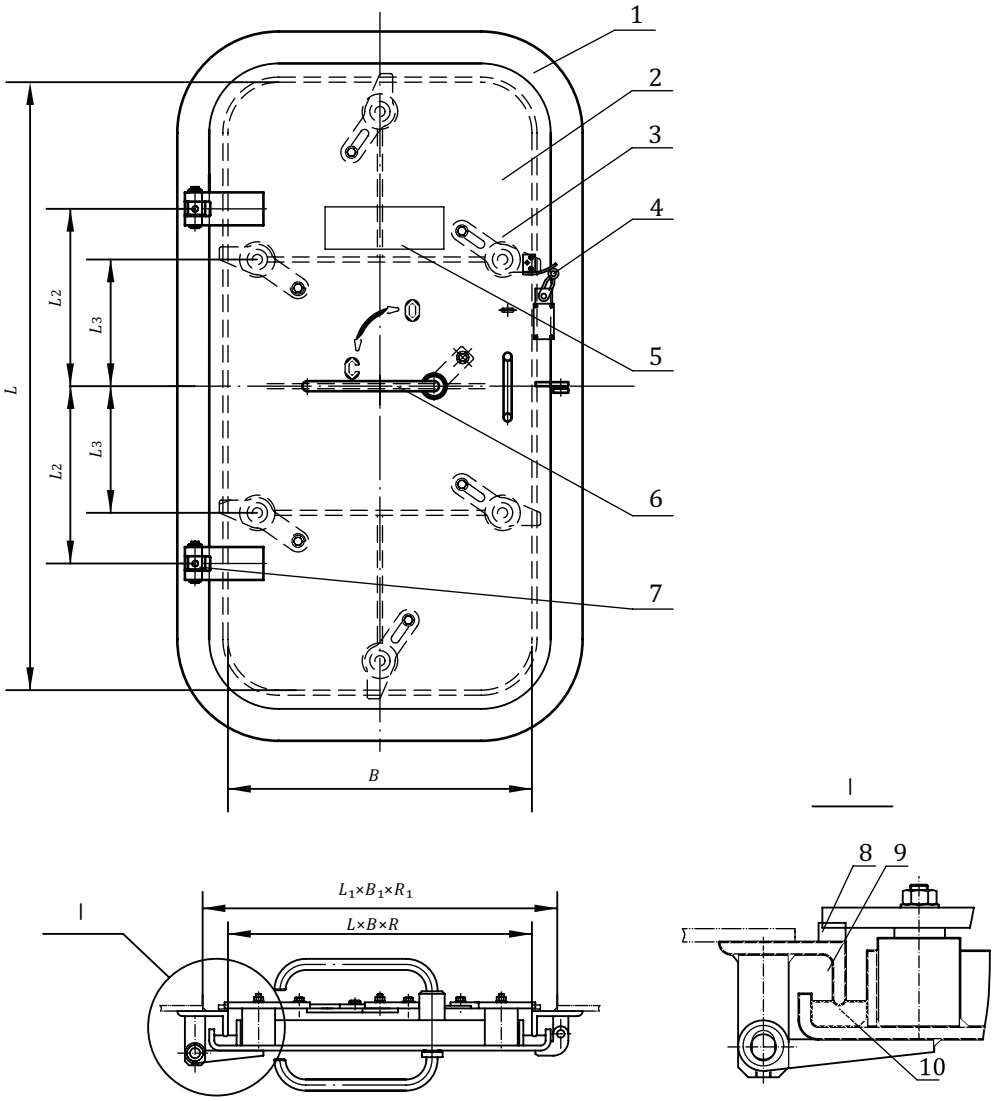
L left-hand

R right-hand

Figure 1 — Opening direction

3.2 Structure and dimensions

3.2.1 The structure and main dimensions of watertight doors shall be in compliance with Figure 2 and Table 1.



Key

1	door frame	6	closing device
2	door plate	7	hinge
3	clip	8	wedge
4	limit switch	9	limit block
5	notice plate	10	seal

NOTE 1 When width B of the watertight door is 900 mm, 2 clips shall be fitted respectively at the top and bottom with a space of 300 mm.

NOTE 2 The figure shown is of a left-hand type door; the structure of the right-hand door is symmetrical to the left one.

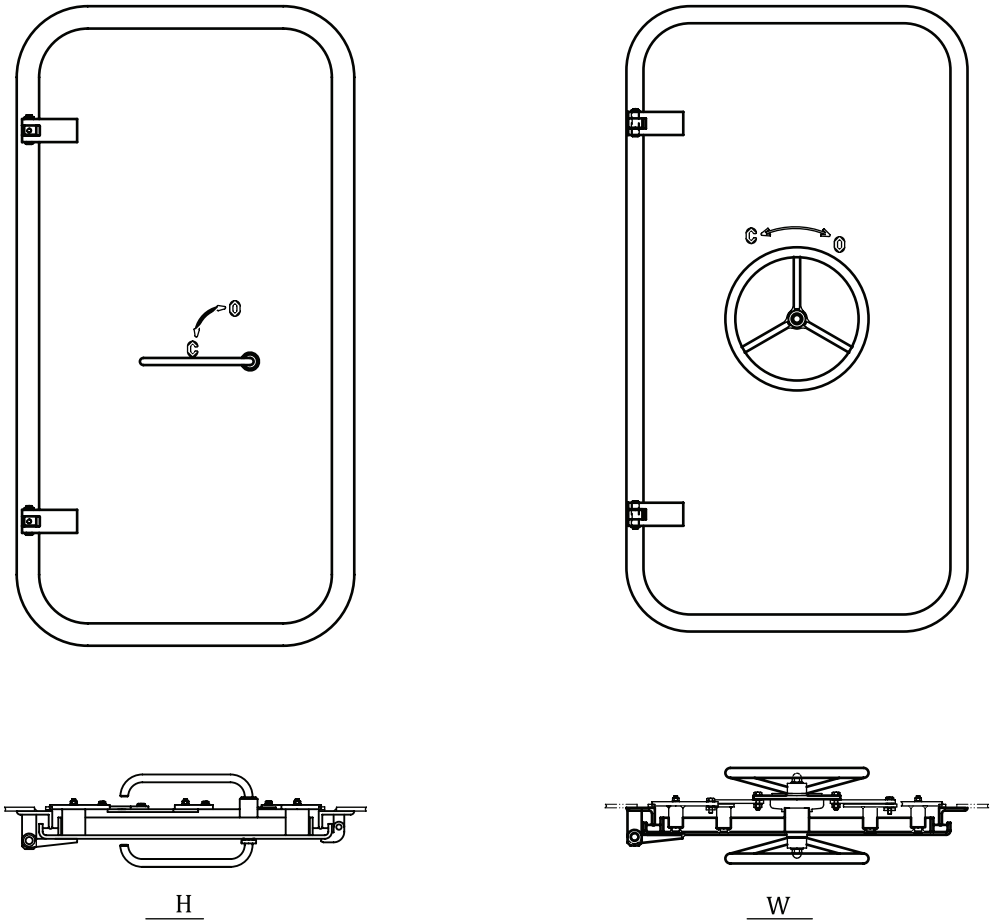
Figure 2 — Structure and dimensions

Table 1 — Main dimensions for watertight door

Dimensions in millimetres

Door nominal size $L \times B \times R$	**Opening dimension** $L_1 \times B_1 \times R_1$	L_2	L_3
1 200×600×100	1 300×700×150	350	250
1 400×600×100	1 500×700×150	450	350
1 400×750×100	1 500×850×150	450	350
1 400×900×100	1 500×1 000×150	450	350
1 500×600×100	1 600×700×150	500	400
1 500×750×100	1 600×850×150	500	400
1 500×900×100	1 600×1 000×150	500	400
1 600×600×100	1 700×700×150	550	450
1 600×750×100	1 700×850×150	550	450
1 600×900×100	1 700×1 000×150	550	450
1 700×600×100	1 800×700×150	600	500
1 700×750×100	1 800×850×150	600	500
1 700×900×100	1 800×1 000×150	600	500
1 800×600×100	1 900×700×150	650	550
1 800×750×100	1 900×850×150	650	550
1 800×900×100	1 900×1 000×150	650	550
NOTE The nominal sizes are to be in accordance with ISO 3796.			

3.2.2 The closing device is divided by two types, as shown in Figure 3.



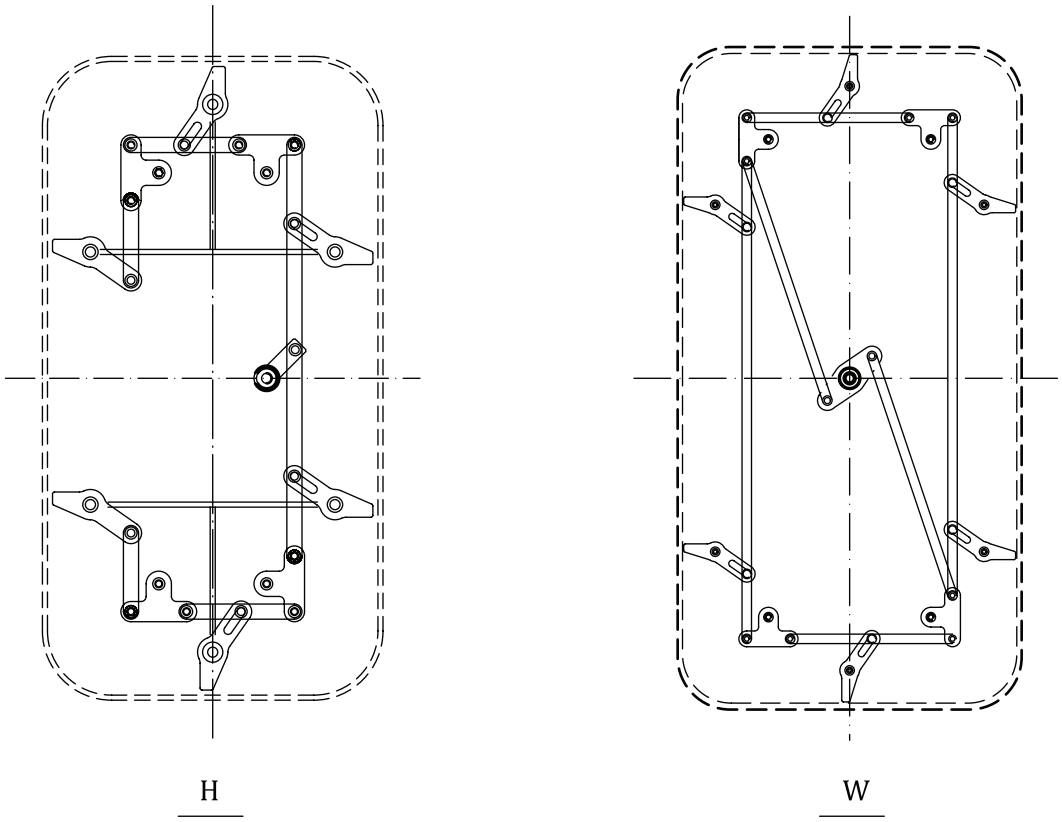
Key

H type H

W type W

Figure 3 — Closing device

3.2.3 A typical connecting rod structure is shown in Figure 4.



Key

H type H

W type W

Figure 4 — Typical connecting rod structure

4 Materials

The door plates shall be manufactured from steel of 355 N/mm^2 minimum yield stress.

The door frames shall be manufactured from steel of 235 N/mm^2 minimum yield stress or equivalent shipbuilding-quality steel.

The door hinges shall be manufactured from mild steel of 235 N/mm^2 minimum yield stress.

The closing device shall be manufactured from corrosion-resistant steel of 315 N/mm^2 minimum yield stress.

Sealing material shall be satisfactory for service under marine conditions.

5 Quality of manufacture

The watertight door surface shall be free from burrs, sharp edges, scratches, indentations and other defects; welds shall be smooth, without defects such as air holes, cracks, slag inclusion, undercut, incomplete fusion, etc.

The door plate and frame shall be not deformed. The derusting grade for watertight doors shall reach Sa2½ or St3 as specified in ISO 8501-1. Anti-cession primer shall be painted.

Watertight door opening and closing shall be flexible without seizure. Moving areas shall be applied with grease for lubrication.

6 Testing

6.1 Testing of watertightness

The watertight door is to be fitted onto the dedicated pressure test box. Increase the water pressure inside the box to 0,1 MPa and keep it for 5 min, then discharge the pressure. No leakage or permanent deformation shall exist on the door.

The maximum test pressure is 0,1 MPa. Test pressure shall be in accordance with the location of each watertight door.

As per the full-scale ship installation condition, the watertight door is to be well fitted onto the pressure test box and is to be closed. A hose test is to be conducted under the pressure not less than 0,2 MPa with a nozzle diameter not less than 12,5 mm. Flushing operation is to be made towards the sealing strap from a distance not exceeding 1,5 m. No water leakage shall exist.

Apply powder uniformly on the door frame, close the door and then open it. The indent pressed on door plate shall be uniform and continuous: contact width ≥5 mm, compression depth ≤4 mm.

6.2 15° inclined test

The watertight door is installed on a simulated device. From both sides, push the watertight door manually inclined to any side (front, rear, left, right) by 15° (see Figure 5). The test result shall be that the door is able to proceed with “closed-open-closed” motions normally.

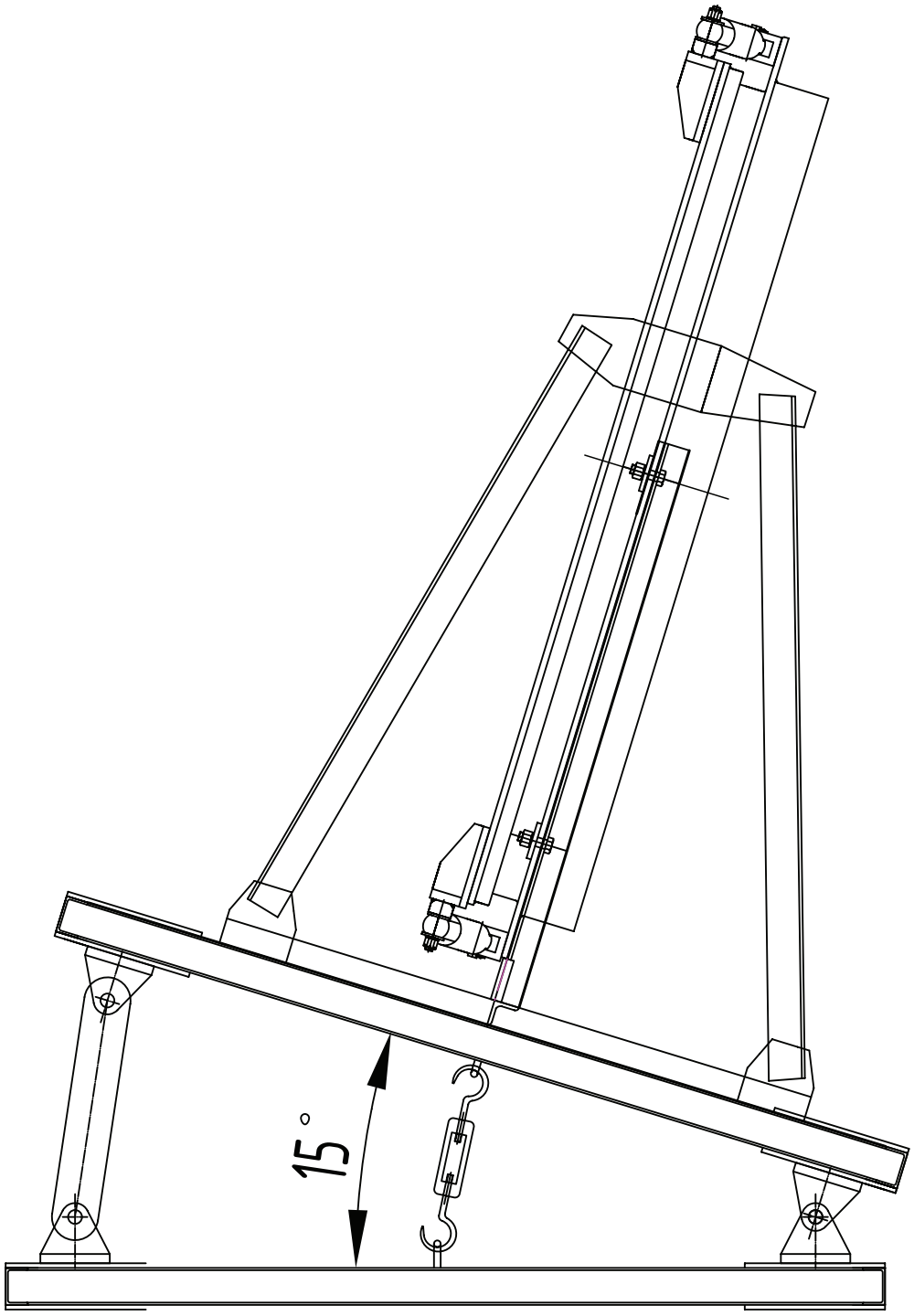


Figure 5 — 1 m head of water watertight door 15° inclined test

7 Status display

A local and remote indication shall be provided to show the door status. The red light will be on when the watertight door is fully open and the green light will be on when the watertight door is fully closed. If the clip is loose, an indicator will be activated with a visual alert. A remote indicator will be on the central operating console on the navigation bridge.

The electrical equipment shall have a protection of IP67, according to IEC 60529.

— Degrees of protection provided by enclosures (IP Code).

A notice plate shall be fitted at both sides of the door to the effect that the door shall be kept closed at sea.

8 Designation

The watertight doors conforming to this International Standard shall be designated as follows, in the order given:

a) the denomination: hinged watertight doors;

b) the code number of this International Standard: ISO 17940;

c) the opening direction: left-hand or right-hand;

d) the pressing tight device: type H;

e) the nominal size.

EXAMPLE The designation for a hinged watertight door type L of nominal size 1 600 mm × 600 mm is as follows:

Hinged watertight door ISO 17940 L H 1 600×600

Bibliography

[1] ISO 3796, *Ships and marine technology — Clear openings for external single-leaf doors*

[2] *International Convention for the Safety of Life at Sea (SOLAS), 1974 with protocol of 1998, consolidated edition 2009 and amendments*

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